



# **ENEC13015 *Steel and Timber Design***

## **Term 1 - 2020**

Profile information current as at 29/04/2024 09:37 pm

All details in this unit profile for ENEC13015 have been officially approved by CQUniversity and represent a learning partnership between the University and you (our student). The information will not be changed unless absolutely necessary and any change will be clearly indicated by an approved correction included in the profile.

### **Corrections**

#### **Unit Profile Correction added on 30-04-20**

The end of term examination was cancelled due to Covid-19 pandemic restrictions. An alternative assessment item has been arranged for the final examination and details are available on the unit's Moodle page. The learning outcomes assessed have not changed.

## General Information

### Overview

This unit introduces Australian Standards used for steel and timber design. Basic material and section properties and factors affecting the properties of structural members are introduced. You will design steel and timber members subjected to axial loads, bending moments and combined actions, then check whether they comply with both ultimate and serviceability limit states as required in AS4100 and AS1720 respectively. Furthermore you also will design steel connection and timber joints according to Australian Standards. You also develop skills in use of the computer software in structural design. You are expected to document the process of analysis and design and communicate, work and learn, both individually and in teams in a professional manner.

### Details

Career Level: *Undergraduate*

Unit Level: *Level 3*

Credit Points: 6

Student Contribution Band: 8

Fraction of Full-Time Student Load: 0.125

### Pre-requisites or Co-requisites

Prerequisites: (ENEC12012 Stress Analysis or ENEC13010 Solid Mechanics) AND MATH11218 Applied Mathematics

Important note: Students enrolled in a subsequent unit who failed their pre-requisite unit, should drop the subsequent unit before the census date or within 10 working days of Fail grade notification. Students who do not drop the unit in this timeframe cannot later drop the unit without academic and financial liability. See details in the [Assessment Policy and Procedure \(Higher Education Coursework\)](#).

### Offerings For Term 1 - 2020

- Bundaberg
- Cairns
- Gladstone
- Mackay
- Online
- Rockhampton

### Attendance Requirements

All on-campus students are expected to attend scheduled classes – in some units, these classes are identified as a mandatory (pass/fail) component and attendance is compulsory. International students, on a student visa, must maintain a full time study load and meet both attendance and academic progress requirements in each study period (satisfactory attendance for International students is defined as maintaining at least an 80% attendance record).

### Website

[This unit has a website, within the Moodle system, which is available two weeks before the start of term. It is important that you visit your Moodle site throughout the term. Please visit Moodle for more information.](#)

## Class and Assessment Overview

### Recommended Student Time Commitment

Each 6-credit Undergraduate unit at CQUniversity requires an overall time commitment of an average of 12.5 hours of study per week, making a total of 150 hours for the unit.

### Class Timetable

#### [Regional Campuses](#)

Bundaberg, Cairns, Emerald, Gladstone, Mackay, Rockhampton, Townsville

#### [Metropolitan Campuses](#)

Adelaide, Brisbane, Melbourne, Perth, Sydney

### Assessment Overview

#### 1. **Written Assessment**

Weighting: 25%

#### 2. **Written Assessment**

Weighting: 25%

#### 3. **Examination**

Weighting: 50%

### Assessment Grading

This is a graded unit: your overall grade will be calculated from the marks or grades for each assessment task, based on the relative weightings shown in the table above. You must obtain an overall mark for the unit of at least 50%, or an overall grade of 'pass' in order to pass the unit. If any 'pass/fail' tasks are shown in the table above they must also be completed successfully ('pass' grade). You must also meet any minimum mark requirements specified for a particular assessment task, as detailed in the 'assessment task' section (note that in some instances, the minimum mark for a task may be greater than 50%). Consult the [University's Grades and Results Policy](#) for more details of interim results and final grades.

## CQUniversity Policies

**All University policies are available on the [CQUniversity Policy site](#).**

You may wish to view these policies:

- Grades and Results Policy
- Assessment Policy and Procedure (Higher Education Coursework)
- Review of Grade Procedure
- Student Academic Integrity Policy and Procedure
- Monitoring Academic Progress (MAP) Policy and Procedure – Domestic Students
- Monitoring Academic Progress (MAP) Policy and Procedure – International Students
- Student Refund and Credit Balance Policy and Procedure
- Student Feedback – Compliments and Complaints Policy and Procedure
- Information and Communications Technology Acceptable Use Policy and Procedure

This list is not an exhaustive list of all University policies. The full list of University policies are available on the [CQUniversity Policy site](#).

## Previous Student Feedback

### Feedback, Recommendations and Responses

Every unit is reviewed for enhancement each year. At the most recent review, the following staff and student feedback items were identified and recommendations were made.

#### Feedback from Moodle

##### Feedback

Assessment feedback needs to be in more detail.

##### Recommendation

Assessment feedback will be improved from the next offering by providing a feedback sheet explaining the marking criteria/breakdown and relevant feedback for each of the key assessable aspects.

#### Feedback from Self Reflection

##### Feedback

Low student engagement in this unit.

##### Recommendation

Use of huddle space for tutorial classes.

## Unit Learning Outcomes

**On successful completion of this unit, you will be able to:**

1. Describe the key material and section properties of structural steel and timber and explain how these properties affect structural performance
2. Explain the limit state design process and check for ultimate and serviceability limit state requirements for steel and timber design
3. Analyse and design steel and timber members and connections subjected to various design actions according to relevant Australian Standards
4. Use computer software to analyse the structures subjected to different load combinations and design as per appropriate Australian Standards
5. Demonstrate a professional level of communication

The learning outcomes are linked to Engineers Australia Stage 1 Competencies and also discipline capabilities. You can find the mapping for this on the [Engineering Undergraduate Course website](#).

## Alignment of Learning Outcomes, Assessment and Graduate Attributes



### Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes				
	1	2	3	4	5
<b>1 - Written Assessment - 25%</b>	•	•	•	•	•
<b>2 - Written Assessment - 25%</b>	•	•	•	•	•
<b>3 - Examination - 50%</b>	•	•	•		•

## Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes				
	1	2	3	4	5
1 - Communication	•	•	•	•	•
2 - Problem Solving	•	•	•	•	•
3 - Critical Thinking	•	•	•	•	•
4 - Information Literacy	•	•	•	•	•
5 - Team Work					
6 - Information Technology Competence	•	•	•	•	
7 - Cross Cultural Competence	•	•	•	•	•
8 - Ethical practice	•	•	•	•	•
9 - Social Innovation					
10 - Aboriginal and Torres Strait Islander Cultures					

## Alignment of Assessment Tasks to Graduate Attributes

Assessment Tasks	Graduate Attributes									
	1	2	3	4	5	6	7	8	9	10
1 - Written Assessment - 25%	•	•	•	•		•				
2 - Written Assessment - 25%	•	•	•	•		•				
3 - Examination - 50%	•	•	•	•						

## Textbooks and Resources

### Textbooks

ENEC13015

#### Prescribed

##### **Steel Designers' Handbook**

Eighth edition (2012)

Authors: Gorenc, B, Tinyou, R and Syam, A

Australian Steel Institute

Sydney , NSW , Australia

ISBN: 9781742233413

Binding: Hardcover

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#### Prescribed

##### **Timber Design Handbook (SA HB 108-2013)**

(2013)

Authors: Boughton, G. N, Crews, K. and Standards Association of Australia

Standards Australia

Sydney , NSW , Australia

ISBN: 9781743423738

Binding: eBook

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#### Supplementary

##### **Worked Examples for Steel Structures**

Fourth edition (2013)

Authors: Bradford, M.A., Bridge, R.Q., Trahair, N.S.

Australian Steel Institute

Sydney , NSW , Australia

ISBN: 9781921476372

Binding: Hardcover

#### Additional Textbook Information

Copies can be purchased from the CQUni Bookshop here: <http://bookshop.cqu.edu.au> (search on the Unit code)

[View textbooks at the CQUniversity Bookshop](#)

### IT Resources

**You will need access to the following IT resources:**

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)

## Referencing Style

All submissions for this unit must use the referencing style: [Harvard \(author-date\)](#)

For further information, see the Assessment Tasks.

## Teaching Contacts

**Kumaran Suntharavadivel** Unit Coordinator

[t.suntharavadivel@cqu.edu.au](mailto:t.suntharavadivel@cqu.edu.au)

## Schedule

**Week 1 - 09 Mar 2020**

Module/Topic	Chapter	Events and Submissions/Topic
Structural Design Process & Limit State Approaches		

**Week 2 - 16 Mar 2020**

Module/Topic	Chapter	Events and Submissions/Topic
Estimation of Design Actions on Structures		

**Week 3 - 23 Mar 2020**

Module/Topic	Chapter	Events and Submissions/Topic
Design of steel members subjected Tension and Compression	Study Guide: Tension Member Study Guide: Compression Member	

**Week 4 - 30 Mar 2020**

Module/Topic	Chapter	Events and Submissions/Topic
Design of Steel Members Subjected to Bending	Study Guide: Bending Study Guide: Shear & Bearing	

**Week 5 - 06 Apr 2020**

Module/Topic	Chapter	Events and Submissions/Topic
Design of Steel Members Subjected to Combined Actions		

**Vacation Week - 13 Apr 2020**

Module/Topic	Chapter	Events and Submissions/Topic
Mid-term Break		

**Week 6 - 20 Apr 2020**

Module/Topic	Chapter	Events and Submissions/Topic
Application of Design Software in Steel Design	Guide to use Spacegass	

**Week 7 - 27 Apr 2020**

Module/Topic	Chapter	Events and Submissions/Topic
Design of Steel Connections Fire & Corrosion Protection	Study Guide: Connections	

**Week 8 - 04 May 2020**

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to Timber Design	Study Resources	<b>Assignment 1</b> Due: Week 8 Monday (4 May 2020) 5:00 pm AEST

**Week 9 - 11 May 2020**

Module/Topic	Chapter	Events and Submissions/Topic
Design timber members subjected to tension and compression	Study Resources	

**Week 10 - 18 May 2020**

Module/Topic	Chapter	Events and Submissions/Topic
Design timber members subjected to bending and combined actions	Study Resources	

**Week 11 - 25 May 2020**

Module/Topic	Chapter	Events and Submissions/Topic
Design of timber connections	Study Resources	

**Week 12 - 01 Jun 2020**

Module/Topic	Chapter	Events and Submissions/Topic
Review		<b>Assignment 2</b> Due: Week 12 Monday (1 June 2020) 5:00 pm AEST
<b>Review/Exam Week - 08 Jun 2020</b>		
Module/Topic	Chapter	Events and Submissions/Topic
		<b>Examination - Please check the exam timetable</b>
<b>Exam Week - 15 Jun 2020</b>		
Module/Topic	Chapter	Events and Submissions/Topic

## Term Specific Information

Please read **ENEC13015: General Information** available in the unit Moodle site.

## Assessment Tasks

### 1 Assignment 1

#### Assessment Type

Written Assessment

#### Task Description

The aim of this assignment is to allow the students to demonstrate their understanding of various concepts, theories and processes studied/developed in steel design.

Assignment 1 will be available by end of week 1 through the unit website.

#### Assessment Due Date

Week 8 Monday (4 May 2020) 5:00 pm AEST

#### Return Date to Students

Week 10 Tuesday (19 May 2020)

#### Weighting

25%

#### Assessment Criteria

**Each question in this assignment will be assessed separately for the criterion accuracy and correct results.**

- Correct application of mathematics and arithmetic
- Answers clearly identified
- Correct results

**In addition, the assignment as a whole will be assessed against the following criteria:**

#### Evidence of correct procedures

- All necessary steps in the analysis are present in the correct order
- Clear presentation of mathematical and arithmetical working linking given details of the problem to the results obtained
- Evidence of checking results (mathematical, graphical, logic-common sense)

#### Evidence of the understanding of the topic

- Explanation of choices made in the analysis (why is the procedure required, why this particular procedure)
- Interpretation of results, eg limitations, the direction of vectors

#### Professional presentation

- The work (job) is clearly identified (problem, date, analyst)
- A clear statement of each problem and its details and requirements
- The logical layout of the analysis
- Appropriate use of diagrams, clear diagrams
- Correct use of terminology, conventions



- Clear English in the explanation of procedure and interpretation of results.

### Referencing Style

- [Harvard \(author-date\)](#)

### Submission

Online

### Learning Outcomes Assessed

- Describe the key material and section properties of structural steel and timber and explain how these properties affect structural performance
- Explain the limit state design process and check for ultimate and serviceability limit state requirements for steel and timber design
- Analyse and design steel and timber members and connections subjected to various design actions according to relevant Australian Standards
- Use computer software to analyse the structures subjected to different load combinations and design as per appropriate Australian Standards
- Demonstrate a professional level of communication

### Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence

## 2 Assignment 2

### Assessment Type

Written Assessment

### Task Description

The aim of this assignment is to allow the students to demonstrate their understanding of various concepts, theories and processes studied/developed in timber design.

Assignment 2 will be available by end of week 7 through the unit website.

### Assessment Due Date

Week 12 Monday (1 June 2020) 5:00 pm AEST

### Return Date to Students

Review/Exam Week Friday (12 June 2020)

### Weighting

25%

### Assessment Criteria

**Each question in this assignment will be assessed separately for the criterion *accuracy and correct results*.**

- Correct application of mathematics and arithmetic
- Answers clearly identified
- Correct results

**In addition, the assignment as a whole will be assessed against the following criteria:**

#### Evidence of correct procedures

- All necessary steps in the analysis are present in the correct order
- Clear presentation of mathematical and arithmetical working linking given details of the problem to the results obtained
- Evidence of checking results (mathematical, graphical, logic-common sense)

#### Evidence of the understanding of the topic

- Explanation of choices made in the analysis (why is the procedure required, why this particular procedure)
- Interpretation of results, eg limitations, the direction of vectors

#### Professional presentation

- The work (job) is clearly identified (problem, date, analyst)

- A clear statement of each problem and its details and requirements
- The logical layout of the analysis
- Appropriate use of diagrams, clear diagrams
- Correct use of terminology, conventions
- Clear English in the explanation of procedure and interpretation of results.

### Referencing Style

- [Harvard \(author-date\)](#)

### Submission

Online

### Learning Outcomes Assessed

- Describe the key material and section properties of structural steel and timber and explain how these properties affect structural performance
- Explain the limit state design process and check for ultimate and serviceability limit state requirements for steel and timber design
- Analyse and design steel and timber members and connections subjected to various design actions according to relevant Australian Standards
- Use computer software to analyse the structures subjected to different load combinations and design as per appropriate Australian Standards
- Demonstrate a professional level of communication

### Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence

## Examination

### Outline

Complete an invigilated examination.

### Date

During the examination period at a CQUniversity examination centre.

### Weighting

50%

### Length

180 minutes

### Minimum mark or grade

50%

### Exam Conditions

Closed Book.

### Materials

Dictionary - non-electronic, concise, direct translation only (dictionary must not contain any notes or comments).  
 Calculator - non-programmable, no text retrieval, silent only

## Academic Integrity Statement

As a CQUniversity student you are expected to act honestly in all aspects of your academic work.

Any assessable work undertaken or submitted for review or assessment must be your own work. Assessable work is any type of work you do to meet the assessment requirements in the unit, including draft work submitted for review and feedback and final work to be assessed.

When you use the ideas, words or data of others in your assessment, you must thoroughly and clearly acknowledge the source of this information by using the correct referencing style for your unit. Using others' work without proper acknowledgement may be considered a form of intellectual dishonesty.

Participating honestly, respectfully, responsibly, and fairly in your university study ensures the CQUniversity qualification you earn will be valued as a true indication of your individual academic achievement and will continue to receive the respect and recognition it deserves.

As a student, you are responsible for reading and following CQUniversity's policies, including the [Student Academic Integrity Policy and Procedure](#). This policy sets out CQUniversity's expectations of you to act with integrity, examples of academic integrity breaches to avoid, the processes used to address alleged breaches of academic integrity, and potential penalties.

### What is a breach of academic integrity?

A breach of academic integrity includes but is not limited to plagiarism, self-plagiarism, collusion, cheating, contract cheating, and academic misconduct. The Student Academic Integrity Policy and Procedure defines what these terms mean and gives examples.

### Why is academic integrity important?

A breach of academic integrity may result in one or more penalties, including suspension or even expulsion from the University. It can also have negative implications for student visas and future enrolment at CQUniversity or elsewhere. Students who engage in contract cheating also risk being blackmailed by contract cheating services.

### Where can I get assistance?

For academic advice and guidance, the [Academic Learning Centre \(ALC\)](#) can support you in becoming confident in completing assessments with integrity and of high standard.

### What can you do to act with integrity?



#### Be Honest

If your assessment task is done by someone else, it would be dishonest of you to claim it as your own



#### Seek Help

If you are not sure about how to cite or reference in essays, reports etc, then seek help from your lecturer, the library or the Academic Learning Centre (ALC)



#### Produce Original Work

Originality comes from your ability to read widely, think critically, and apply your gained knowledge to address a question or problem